



**Company Information**

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|----------------------|--|----------------------------------|------------------|
| <b>Company Name</b>  | <i>Oxit</i>                                      | <b>Date Submitted</b>            | <i>6/9/2021</i>  |
| <b>Project Title</b> | <i>LoRaWan Based Panic Button (OXIT_LORAWAN)</i> | <b>Planned Starting Semester</b> | <i>Fall 2021</i> |

**Senior Design Project Description**

**Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

| <b>Discipline</b>            | <b>Number</b> | <b>Discipline</b> | <b>Number</b> |
|------------------------------|---------------|-------------------|---------------|
| Mechanical                   |               | Electrical        | 2             |
| Computer                     | 2             | Systems           |               |
| Other (                    ) |               |                   |               |

**Company and Project Overview:**

Launched in 2014 by UNC Charlotte ECE alumni, Oxit has continually focused on true innovation in IoT services through the creation of solutions and products for an adaptive global business marketplace. Our diverse list of clientele, ranging across a multitude of industries, has grown to recognize and trust Oxit in partnering in all aspects of Smart Technology capabilities from designing to prototyping, development and carefully launching their ideas. With each client, our goal is to improve necessary success-focused metrics, assist in building revenue and commercial growth, expanding possibilities for customer service and experience, and create immersion that strengthens the foundations of brand positions.

*This project will utilize LoRaWAN technology.* The LoRaWAN® specification is a Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated ‘things’ to the internet in regional, national or global networks, and targets key Internet of Things (IoT) requirements such as bi-directional communication, end-to-end security, mobility and location services.

**Project Requirements:**

Utilizing the LoRaWAN connectivity protocol and the power of IoT, create a prototype for a connected “Panic” Button. The Panic Button will be a low cost device that can send alerts through LoraWAN to the Internet for a safety application within classrooms. The button can be pushed if there is an emergency situation requiring police or fire. Due to the characteristics of LoraWAN the range for operation can be wider and more robust than wi-fi. Explore the full spectrum of utilizing hardware, industrial design, and software development to create a proof of concept for a Panic Button that along with triggering a silent alarm, can potentially open communications to a dispatcher and communicate information like location, proximity and total people count, and time-stamping.

**Expected Deliverables/Results:**

- Working prototype of a network of multiple devices operating over a LoraWAN network.
- All electrical schematics, BOM’s, drawings and code
- Determine the feasibility of a buzzer or audible alert tone when triggering alarm
- A notification on a desktop for windows based PC is required. Decide the parameters of what the notifications are
- Proximity sensing when alarm is triggered
- Complete industrial design of the device enclosure: dimensions, shape, switch design, push button mechanics
- Consider the potential for unintended button press within industrial design, and the balance between ease of access in an emergency situation versus deterrence for false alarms. Shape of the push button final design must be conducive to accidental depression prevention
- Determine the feasibility of a Panic Button device design that is both fixed/permanently mounted, as well as mobile, key-ring and design accordingly
- Indoor device application, room temperature operation with no water issues
- Has to be standalone
- Has to not require an external power source
- Non replaceable battery
- Periodic heartbeat that gives the lifetime

**Disposition of Deliverables at the End of the Project:**

Hardware developed is the property of the Industry Supporter. The work product will displayed at the last Expo then immediately handed over to the supporter unless arrangements have been made to deliver at a future date.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Interest in Internet of Things, LoraWAN and wireless communications
- Students should have skills and interest in schematic design.
- - Course prerequisite: ECGR 3123 Data Communication and Networking I.
- We do encourage students to take (in fall 2021) or have taken a course on Internet of Things (such as ECGR 4105 or ECGR 4127) or should have interest to take ECGR 4187 course (Data Communication and Networking II) in fall 2021.